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2. Adaptations of words to texts not composed for them.
3. Rhythm and Meter; relations between the two.
4. Unity of sentiment between words and music.
5. Collect and bring to the class songs that seem to you to be especially good in this agreement between words and music, both in sentiment, mood, and in accent. We find that texts demand music of distinct character. What have the elements of pulsation, variation of pitch, and combinations of tones in chords to do with this character? Since pulsation in the form of rhythm is a most important element as a stimulus to movement, we will study that essential first.

Rhythm.

1. Physical basis: What are the necessary rhythms of life? of action? tactual and auditory stimuli that arouse rhythmic images?
2. Experiment with watch, metronome, and with the sounds caused by the revolutions of train wheels. Do they group themselves? If so, in what forms? Can you vary these forms at will?
3. Does the rhythm possess you, or do you control the rhythm?
4. Reproduce these rhythms in measure, in periods.

References: Titchener, *An Outline of Psychology*, p. 172; Wundt, *Human and Animal Psychology*, p. 262; Scripture, *The New Psychology*, p. 13; Fiske, *Outlines of Cosmic Philosophy*, p. 299; Lanier, *Science of English Verse;* Bolton (monograph); Froebel, *Education of Man*, Sec. II, p. 70; Richter, *Levana*, p. 162.

Physical Training

Carl J. Kroh Caroline Crawford

The interdependence of mind and body is best exemplified by those studies which involve action, observation, and representation. Wherever this has supplemented the unrelated methods of old, mind and body training may be said to go hand in hand, as in the case of the numerous forms of manual training.

Physical training, gymnastics, through its education of the neuro-muscular organism, reinforces all the modes of expression. To strengthen the attention and memory by exercise in "doing" is to strengthen the idea. Our motor experiences become our mental experiences, emphasized in many ways through our sense-perceptions. Perceptions of weight, distance, and resistance, for instance, are primarily acquired through the study of our own movements. Later, these perceptions are applied in movement-forms of a more complex nature, required in our daily pursuits. Properly directed effort thus enables us to use our muscular system in an efficient way; motion and locomotion are economically adjusted and the paths of least resistance are established.

Naturally, the child has already developed the fundamental movement-forms, regarded as the basis of all specific training. New co-ordinations are now required, and the importance of appropriate procedures, conducive to correct habits of action, is constantly emphasized. This distinctly educational end is dependent in many ways on functional improvement. It implies the improvement or maintenance of health. Hygienic and educational ends cannot be disassociated.

The order of the development of the nervous system, the principal factor in education, and its ability to receive and hold impressions and to record effects, in a measure determine the characteristic procedures of rational physical training. Direction in gymnastic training, therefore, to become duly effective, must be in accord with certain pedagogical principles. It must conform to an elementary order. The pupil's ability to do must not be exceeded through premature demands for precision, accuracy, strength, or skill. To become nerve-stimulating and interesting in its order and development, action must be so planned that the cultivation of the volitional powers may proceed without the retarding influences of fatigue.

As success in manual training depends upon the exactness of the measurements, the correctness of the constructive design, and the accuracy of co-ordination, so success in gymnastics, which implies a better adjustment of the whole muscular organism toward accurate, quick, and skillful response, depends upon the most careful attention to the details of progressive development.

As each movement-form in itself represents a mechanical problem, attention at first must be concentrated upon it alone. The order of procedure must be natural, the sequential development logical.

One of the first studies during the past quarter involved tests of control. A newly organized school met for the first time. The classes moved from place to place in an orderly manner, but without the characteristic dispatch of purposeful movement. In the Pedagogic School, marching, therefore, was proposed as a topic, and the order of its development attempted in practice. Rhythm in uniform forward movement was regarded as the first requirement, the order of development being from slow to moderately fast rhythm. To insure uniform halting, the step was next considered. Uniform movement, rhythm, and step attained, halting was practiced. Halting from marching on place (marking of time), requiring, as it did, less control, there being no momentum to overcome, although the exercise was classed as volitional and not reflex, was considered a preparatory practice to halting in movement from place. Change of direction was practiced in the same way by facing on place, then in connection with movements on and later from place. The complete exercise was finally repeated in running.

Springing or jumping exercises were practiced in a like manner. Jumping from a starting-line, standing, to command and without special direction, preceded the special practice of "start" and "landing." Good form in execution invariably determined the next step.

In a discussion of details of execution this order was reaffirmed in an interesting manner. The first interest of a class of pupils in marching exercises was recognized in the attention aroused by the regularly recurring step. The pleasurable satisfaction which came with the fairly well-marked execution of the alternate slow and moderately fast rhythmic movement was augmented when the halting to command was accomplished equally well, although the distances between pupils became deranged. The adoption of some mode of halting seemed advisable. This again necessitated practice. In the beginning the class had to be cautioned before the command to halt could be executed. Inhibitive impulses varied. Attention! Halt! was spoken on the right step, the left foot was advanced and the right foot placed next it without overstepping. In this way ample time for stopping was allowed and uniform halting became possible. In the upper grades the direction to halt could now be given with either step, and later instantaneous halting, left or right, was successfully attempted. The repetition of this practice in running required a high degree of control and was possible only with the High School boys, and then only when specially signaled. The practice of facings and movement in different directions, of modes of movement, forward, sideward, backward, followed in quick succession.

Helpful suggestions were made. The time required by the different classes to cover the distances from the class-rooms to the gymnasium or play-grounds, for instance, was ascertained through a comparison of steps and seconds. The design of a running course was preceded by interesting number work. Number work was also correlated with the study of ventilation. The gymnasium, locker, and dressing-rooms were measured, and heights ascertained by triangulation. This led to an estimate of the volume of air in the different rooms, to tests of individual breathing capacity, and to a calculation of the air needed in the respective rooms. (See Grammar Grade outlines in December COURSE OF STUDY.)

Jumping without direction at once revealed the steps to be followed in practice. Pupils jumped from the board upon the mats awkwardly, without yielding, on the whole foot, etc. To obviate this difficulty, attention was directed to the execution of the foot and leg exercises alone, the arms being held in fixed positions, as with hands on hips, or placed on shoulders. Heel elevation, knee-bending, landing with proper yielding and erect body, as indicated in the practice of the start, was successfully mastered; the arm movements accentuating the jumping effort were also separately practiced, and with reference to direction of jump. The combination of the various movements and their correct execution over increased heights and distances became possible in rapid and orderly work. The ill effects of faulty jumping, noise, etc., were avoided. Greater ease of movement and perceptible improvement in bearing and carriage indicated much better control.

Progress in the above practice of marching, running, and jumping forms, however, depended much on the emphasis placed on the practice of free standing exercises. Their importance as a means of elementary body-building, as well as of thorough development, is fundamental. They are invaluable as a means of preparation for the more progressive work of the gymnasium.

Marked differences were suggested in the execution of exercises by boys, as distinguished from an execution of similar exercises by girls. With boys a different treatment, both in matter and method, is required than with girls; the need of swift, tense, and strong exercises predominates; whereas with girls a slow, rounded and graceful movement, to the exclusion of all sudden and strenuous exertion, seems to be required.

Thus the acquirement of appropriate movement-concepts, gained through resolute and discreet application in gymnastics, becomes a means of reinforcing all work requiring correct observation and representation.

Answers to Questions

The question has been asked, " How do you test individual proficiency in gymnastics?" The answer is, that this testing is going on all the time. It is summed up in the final " course tests"—an inquiry into the student's proficiency in skill, dexterity, strength, and endurance. These tests embrace contests and appropriate exercises, approved and judged by the staff of the Physical Training Department conjointly with the Faculty Committee on Sports and Games. Together with the record of the student's growth and improvement, established through a comparison of physical measurements taken at the beginning and close of the school year, they reveal his rank in his class.

"Do you have recreative forms of exercise, as plays or games, in connection with your regular gymnasium work?"

Yes. The indoor practice of games and plays of the Grammar Grades during October included a number of running and tag games, as "peel-away," and ball games, as "roll-ball," and "pass-ball." The outdoor practice consisted of football games. In November "dodge-ball" was played; the game of "basket-ball" was suggested. Outdoor practice of football teams closed with a contest between an upper grade team and a team from the University school.

Records in standing and running broad and high jumps, and in climbing, were taken toward the close of the month.

Indoor practice during December included practice in "basket-ball," "volley-ball," "battle-ball," and "curtain-ball." Teams of the Academic and Pedagogic departments met at various times in contests. The Grammar Grades and High School classes played "hare and hounds" in Lincoln Park, also "center-ball."

Peel-away, pass-ball, roll-ball, center-ball, volley-ball, hare and hounds, etc., are described in Vols. II–VII of *Mind and Body*. For football, see *The Spalding Guide*.

The School Museum

Ira B. Meyers

The Museum deals directly with materials used in the regular work of the school. In its relation to field, laboratory, and class-room work, it aims to aid students in selecting and arranging materials to illustrate points of class study and to afford them the advantages of materials in study.

The collected materials in the beginning consist of more or less isolated specimens, which soon begin to combine into related series; as an example, a piece of weathered sandstone, a glacial bowlder or a beach pebble may illustrate forms of rock disintegration. These accumulated specimens are arranged into a series to illustrate the action of the different agents of erosion, and the appearance of the materials on which they act; e. g., (a) weathering, (b) wave-action, (c) running-water, (d) wind, (e) glacial action.

These again separate into series showing the effect of each agency on a single variety of rock with different stages of disintegration and the final disintegrated product; e. g., clays, sands, and soils.

Similar collections are made illustrating some natural or industrial relation of plants, animals, or minerals; e. g.:

1. The relation of form to function in animals and plants. (See series at end of paper.)
2. The relation of color to function—insect or plant coloration.
3. Stages and processes from iron ore to finished steel.
4. Stages and processes from cotton plant to finished cloth.
5. Various commercial products received from a single natural product—coal. The seeds that may be selected from the natural and industrial world are as varied as the needs and conditions of nature and man.

Collecting demands of the student a definite purpose to insure the selection of materials that will show relationship whenever they exist.

The educational value of any material is its appeal to the observer, and in this appeal it must reveal function or force. It must reveal itself as being what it is because of its position in nature.

All materials exhibit relations of force or function, but these relationships are